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(71) Applicant: **DAIHATSU MOTOR CO LTD**

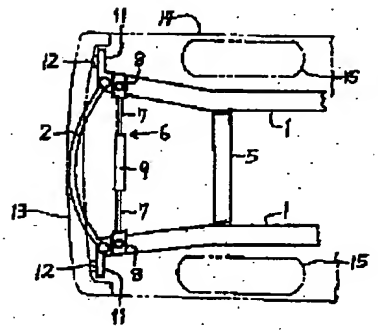
(72) Inventor: **TAKE KAZUO**

(54) **SHOCK ABSORBING APPARATUS FOR AUTOMOBILE**

(57) Abstract:

PROBLEM TO BE SOLVED: To increase the compartment area by reducing a space as much as possible that is required for a shock absorbing apparatus itself.

SOLUTION: In this shock absorbing apparatus for automobile, an impact force deflection member 2, overhanging in the front or rear side, is made of an elastic material. Each end of this member is connected to the tip of a frame member 1 disposed in the longitudinal direction of the vehicle body. Further, an energy absorbing means 6 is bridged to the frame member 1 near the impact force deflection member 2. When the frame member 1 is spread out by the force from the impact force deflection member 2, the energy absorbing means 6 is activated.



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CLAIMS

[Claim(s)]
[Claim 1] The impact absorber of the automobile characterized by forming the impulse force turning member of the configuration jutted out over the front or back with a spring material, combining the ends of this member with the point of the frame member arranged at the cross direction of a car body, and operating a energy-absorbing means with the variation rate of a frame member.
[Claim 2] It is the impact absorber of the automobile which will constitute a frame member so that the spacing may be expanded, and will be characterized by constructing the energy-absorbing means over the frame member near the impulse force turning member if a frame member is made into right and left or the thing which accomplishes a pair up and down in claim 1 and an impulse force turning member is pushed in.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention belongs to the field which changes the direction of the impulse force which acts on a cross direction about the impact absorber of an automobile, and performs an effective impact absorption.
[0002]
[Description of the Prior Art] As a means of the impact absorption to a collision and rear-end collision of an automobile, conventionally, plastic deformation is made to perform to the member prolonged in the cross direction of an automobile, and the impact is absorbed. JP,5-54160,U is one of typical things of such a method.
[0003]
[Problem(s) to be Solved by the Invention] By the way, it is necessary to secure a tooth space required for an impact absorption to the cross direction of an automobile as they are the above methods. Therefore, in order to carry out sufficient impact absorption, the space of a vehicle room will become narrow and the problem of spoiling the amenity of an automobile arises. Furthermore, in the car body of a cab over type which does not have tooth space sufficient ahead of a car body, the above-mentioned problem may become still severer, and, in a remarkable collision, it may influence even in vehicle room space.
[0004]
[Means for Solving the Problem and its Function] It is what was offered in order that this invention might solve the trouble stated above. Invention of claim 1 The impulse force turning member of the configuration jutted out over the front or back is formed with a spring material. It is what is characterized by combining the ends of this member with the point of the frame member arranged at the cross direction of a car body, and operating a energy-absorbing means with the variation rate of a frame member. The impulse force at the time of a collision acts on a frame member through an impulse force turning member, and operates a energy-absorbing means with the variation rate of the frame member produced by it. If, as for invention of claim 2, an impulse force turning member is pushed in in claim 1 by considering as right and left or the thing which accomplishes a pair up and down, as for a frame member, a frame member is constituted so that that spacing may be expanded, and it is characterized by constructing the energy-absorbing means over the frame member near the impulse force turning member, and an impulse force turning member extends the frame member which accomplishes a pair, and a energy-absorbing means is operated with this variation rate.
[0005]
[Embodiment of the Invention] According to the operation gestalt of invention of a graphic display, this invention is explained in detail. Although this invention can be similarly carried out even if it is any of the anterior part of an automobile, and the back, in all the cases of a graphic display, it has illustrated as an operation gestalt of anterior part. First, if drawing 3 is explained from drawing 1 , signs 1 and 1 are the frame members of a couple, and are arranged at parallel at the cross direction of an automobile. As a concrete member name of this, a ladder type frame like a graphic display, the side member in MONOKKUBODE -, etc. correspond. the impulse force turning member 2 -- the front (if it is the back back) -- flare appearance -- it is a configuration the bottom and the ends are combined with the point of the frame members 1 and 1. The impulse force turning member 2 is made from a spring material like spring steel, and has incurvated the long and slender plate in the shape of

radii like a graphic display.
[0006] Although things various as structure which combines the impulse force turning member 2 with the point of the frame members 1 and 1 can be considered, form a body 3 in the edge of the impulse force turning member 2 here, insert this in the interior of the hollow of the frame member 1, a body 3 is made to penetrate a shaft 4, and a shaft 4 is fixed for example, welded to the frame member 1.
[0007] The frame members 1 and 1 of drawing 1 are ladder type frames, it is combined by the cross member 5 and, as for here to the before side, spacing of a frame is large gradually. Moreover, the energy-absorbing means 6 is arranged near the impulse force turning member 2 in the cross direction of an automobile, and the so-called "erection" over which it built between one has been carried out [both the frames 1 and]. The ends of a rod 7 are firmly combined with frames 1 and 1 through splices 8 and 8, and, as for the energy-absorbing means 6, the absorption member 9 is installed in the pars intermedia. Although the format of the absorption member 9 can consider various things, what permutes impulse force by work of plastic deformation is common. The thing of drawing 3 is what folded up the long and slender griddle 10 in the shape of zigzag, and rods 7 and 7 are welded to the both sides of a griddle 10, respectively. In addition, although splices 8 and 8 are illustrated in simple, since this part does not separate actually or the bottom does not become, it is suitable to constitute splices 8 and 8 from a character type member of big KO, to insert frames 1 and 1 in that inside, and to make it make a shaft penetrate.
[0008] Brackets 11 and 11 are fixed to the front end of frames 1 and 1, and the bumper 13 is attached through the bond part material 12 and 12 attached in it. A sign 14 is the shell plate of a car body, and 15 is a front wheel.
[0009] Actuation of the above operation gestalt is explained. If a collision occurs, since a bumper 13 tends to deform and the impulse force turning member 2 tends to become straight from a bow condition at it and coincidence, the anterior part of frames 1 and 1 is extended and the absorption member 9 is pulled by right and left with rods 7 and 7 in connection with it. Therefore, a griddle 10 is extended serrate or almost straightly from the condition of having been folded up. It is important for deformation of the above-mentioned impulse force turning member 2 that it is elastic deformation. It is because the force which impulse force turning member 2 the very thing causes plastic deformation, therefore extends the energy-absorbing means 6 will not occur if it is not elastic deformation. Although the graphic display has not been carried out, and elastic deformation is mainly carried out to the impulse force turning member 2, the method of making plastic deformation share with a part and this member 2 can also be hung up as 1 operation gestalt of this invention.
[0010] The modification of the absorption member 9 is explained according to drawing 4 and drawing 5 . This thing is a thing of the format which persists in a pin in a narrow slot, and rods 7 and 7 are made from pipe material, and it fits in each other in the telescopic condition. It is made to have advanced into the slotted hole 17 of the longitudinal direction to which the pins 16 and 16 fixed to the inside rod 7 ended to the outside rod 7, the part 18 narrower than the diameter of a pin 16 is formed in the slotted hole 17, and impulse force is changed into the work to which the narrow part 18 is made to expand.
[0011] Furthermore, the modification of other absorption members 9 is explained according to drawing 6 and drawing 7 . It is a thing of the format which crushes a straight cylinder in the shape of bellows, this thing welds the case 19 made from a cylindrical steel plate to one rod 7, makes the rod 7 of another side advance into a case 19, and welds a disc 20 at that head. The cylinder 22 has been arranged between a disc 20 and the end plate 21 of a case 19, and the rod 7 has penetrated like a graphic display in a cylinder 22. The cylinder 22 is manufactured with aluminum or copper.
[0012] If impulse force acts on a energy-absorbing means, the straight cylinder 22 is crushed by the longitudinal direction between a disc 20 and an end plate 21, like drawing 7 , it will be made to transform a cylinder 22 in the shape of bellows, and energy-absorbing will be made. In addition, the thing of the principle which absorbs energy by passage resistance of a fluid is also employable as the absorption member 9. The most general thing ends a control orifice at the piston which moves in the inside of the cylinder filled up with oil.
[0013] Drawing 8 is the modification of an impulse force turning member, fabricates the band-like substrate 23 by an ordinary structural steel plate or FRP (fiber consolidation resin), and welds or pastes up the aggregate 24 made from spring steel on this.
[0014] Drawing 9 is an example of structure which makes the impulse force turning member 2

engage with the frame member 1, the edge of the impulse force turning member 2 was inserted in the hollow 25 formed inside the frame 1, and flexible maintenance of this member 2 is made for the elasticity of the impulse force turning member 2.
[0015] Drawing 10 was divided into the rod members 26 and 27 of right and left of the impulse force turning member 2, and both the rods member is attached to frames 1 and 1 by the central joint pin 28 and the joint pins 29 and 30 on either side. Impulse force is absorbed by each pin bond part like [when axial motion is permitted and the part of the joint pin 28 is pushed in at the time of a collision] the case where it is drawing 1 .
[0016] Although the impulse force turning member is arranged crosswise [of an automobile] with the operation gestalt explained previously, drawing 11 and drawing 12 are operation gestalten by which it has been arranged in the vertical direction. The car-body format in this case is the monocoque body, and the appearance of a car body is expressed with the two-dot chain line shown with the sign 14. The frame members 33 and 33 which it was welded in the condition that cross members 32 and 32 have been stationed up and down, among the front pillars 31 and 31 on either side, and were welded to the cross member are lengthened ahead. The same impulse force turning member 2 as the above-mentioned thing is constructed over the point of the frame members 33 and 33, and the still more nearly same energy-absorbing means 6 is constructed near the impulse force turning member 2. Since he understood actuation of this operation gestalt easily from the thing of drawing 1 , detailed explanation was omitted here.
[0017] Although a chief aim is set for an above-mentioned operation gestalt to absorb the striking energy of primary impact and it is constituted, the operation gestalt of drawing 13 is the case where this invention is applied to the so-called secondary impact into which an engine 37 is moved by collision and the skeletal structure of a car body is made to deform by this. That is, the impulse force turning member 2 and the energy-absorbing means 6 are constructed among the front pillars 31 and 31 on either side. The ends of a member 2 and a means 6 are firmly combined with front pillars 31 and 31 by welding. In addition, in this structure, since the force to which it is going to move front pillars 31 and 31 back occurs, reinforcing materials 39 have been attached in the interior of a door 38. If an engine 37 moves back at the time of a collision, it runs against the impulse force turning member 2, and spacing of front pillars 31 and 31 will be expanded by this, and the energy-absorbing means 6 will be operated by it.
[0018] The operation gestalt of drawing 14 uses the impulse force turning member 2 and the energy-absorbing means 6 as one unit. Therefore, shafts 35 and 36 are used for a bracket 34, unitization of the energy-absorbing means 6 is carried out to the impulse force turning member 2, and this bracket 34 is attached in the frame members 1 and 1 or the point of 33 and 33.
[0019] Although not indicated to a claim, it is as follows when the configuration and the operation effectiveness which are acquired from an above-mentioned operation gestalt are listed. Since the impulse force turning member 2 and the energy-absorbing means 6 were made to approach in the longitudinal direction or the vertical direction of an automobile and are arranged, it becomes possible to pack a member 2 and a means 6 into a compact, and is advantageous on car-body arrangement. By carrying out unitization of the impulse force turning member 2 and the energy-absorbing means 6 like drawing 13 , installation and installation of an impact absorber assemble, and it becomes very sometimes easy.
[0020]
[Effect of the Invention] According to this invention, the impulse force turning member of the configuration jutted out over the front or back is constituted from a spring material, since the ends of this member were combined with the point of the frame member arranged at the cross direction of a car body, a frame member can be moved with the variation rate produced to the ends of an impulse force turning member at the time of a collision and a rear-end collision, and a energy-absorbing means can be operated by this. Furthermore, to a frame member, since the pair is accomplished up and down, right and left or the force produced in deformation of an impulse force turning member makes a frame member extended, and the energy-absorbing means constructed between frame members is operated by this. Since the impulse force turning member and the energy-absorbing means exist in always [common] as a usual cross member, they can common-use-ize an impact absorber and a cross member, and are effective for structure simplification. Since arrangement of the structure required for an impact absorption can be performed at the dimension of the cross direction of an automobile, or the vertical direction as mentioned above, the tooth-space problem on the above

car-body configurations can be solved, and a car body with safety high simultaneous more can be obtained.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the top view showing the operation gestalt of this invention.
[Drawing 2] It is the partial front view of the part which combines an impulse force turning member with a frame member.
[Drawing 3] It is the top view of an absorption member.
[Drawing 4] It is the top view of other absorption members.
[Drawing 5] It is the side elevation showing the part of a slotted hole.
[Drawing 6] It is the crossing top view of other absorption members.
[Drawing 7] It is the partial vertical section side elevation showing absorption deformation of the thing of drawing 6 .
[Drawing 8] It is the partial pictorial drawing showing the modification of an impulse force turning member.
[Drawing 9] It is the partial top view showing the engagement condition of an impulse force turning member and a frame member.
[Drawing 10] It is the top view showing other operation gestalten.
[Drawing 11] It is the partial pictorial drawing showing other operation gestalten.
[Drawing 12] It is the simple side elevation which looked at the thing of drawing 11 from width.
[Drawing 13] It is the partial pictorial drawing showing the operation gestalt at the time of secondary impact corresponding this invention.
[Drawing 14] It is the partial top view showing other operation gestalten.
[Description of Notations]
2 Impulse Force Turning Member
1 Frame Member
6 Energy-absorbing Means

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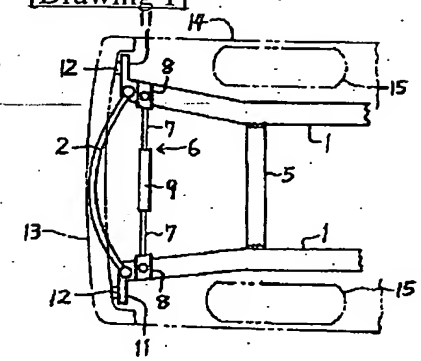
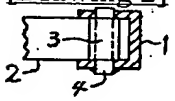
DRAWINGS

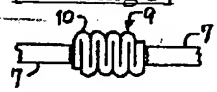
[Drawing 1]



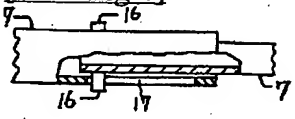
[Drawing 2]



[Drawing 3]



[Drawing 4]



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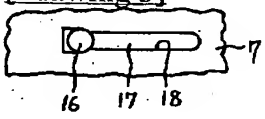

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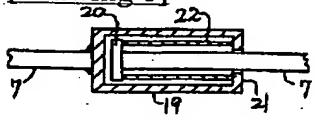

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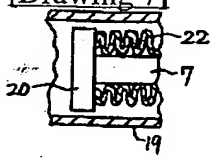

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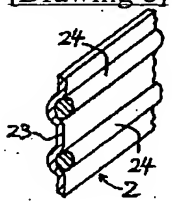
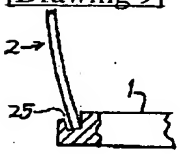
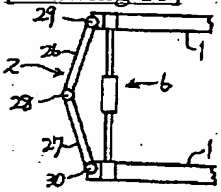


[Drawing 9]



[Drawing 10]



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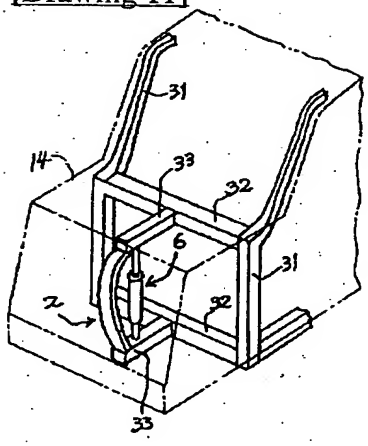

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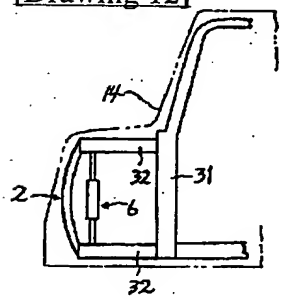
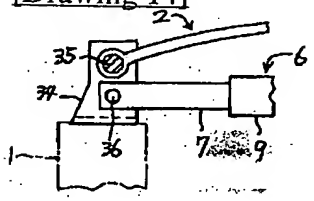
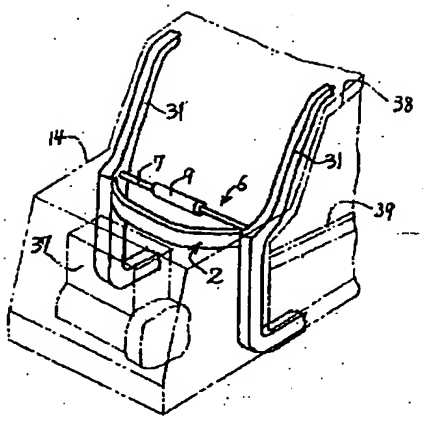


[Drawing 14]



[Drawing 13]



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